000063295

Date:

January 27, 1995

To:

Peg Witherill, Kurt Muenchow

From:

Paul Singh &

X3490

Subject:

Analysis of OU7 Seep Data

cc:

L N Klatt, ORNL

A preliminary analysis of the OU7 Seep Data (SW97) was performed to determine the best method for treatment of the water. Since the source of the water is the landfill, water may be considered a listed waste under RCRA. EG&G has proposed treating the water using a combination of OU2 and OU1 treatment facilities (Attachment 1). Although this option is viable, it may not be desirable. Operation of the OU2 metals removal system will generate significant quantities of waste which will require disposal and data indicate that treatment for organics is not needed.

Analysis of the volatile organics (benzene, methylene chloride, and vinyl chloride) data shows that it cannot be stated with certainty that the seep water is contaminated (Attachment 2) The levels of these compounds reported in the RFEDS data base are very close to the detection limits. In addition, naphthalene is only detected at very low concentrations.

Metals (barium, iron, manganese and zinc) are detected at levels higher than those usually encountered in groundwater. The elevated level of metals is probably due to reducing conditions encountered in the landfill and presumably result from dissolution of soil minerals.

The preferred option for handling the seep water is a proposal to EPA and CDPHE to delist the water (a mini risk assessment can be performed as was done on OU1 and OU2) and continue with the present monitoring effort. The landfill pond provides a effective mechanism for removal of the metals (if the landfill pond is eliminated, an engineered wetland is preferable). If this option is rejected by the agencies, then it is desirable to send the water to the sewage treatment plant.

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Attachment 1

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JEGEB ROCKY FLATS

INTEROFFICE CORRESPONDENCE

DATE.

December 21, 1994

TO:

M. C. Burmeister, EOM, Bldg. T891A, X5891

FROM

L J Peterson-Wright, OU 5, 6, 7 Closures, Bldg. 080, X855

SUBJECT

OU7 PROPOSED PERFORMANCE STANDARDS - LJPW-025-94

DOE Order

4700.1

Action

Review performance standards

Attached please find the OU 7 Proposed Performance Standards. These standards have been reviewed by the public and the regulatory agencies in the Proposed Action Memorandum The Proposed Action Memorandum was approved by the CDPHE on December 8, 1994.

Please review these performance standards with respect to the capability of OU 1, OU 2 and/or sitewide facility to treat the OU 7 effluent. Please respond at your earliest possible convenience.

I appreciate your assistance during the conceptual design phase of this project and I look forward to working with you during operation. If you have any questions please call.

LJPW cb

Attachment As Stated

5w97

Constituents	Ave Conc (μg/L)	Max Conc (μg/L)	OU7 Performance Standards (µg/L)	Reference	Comment
Antimony	22	60.4	14	5 CCR 1002-8 state standard drinking water	Standard 30-day average
Barıum	640	1,550	1,000	5 CCR 1002-8 state standard human health, CWA-AWQC for protection of human health, water and fish ingestion	
Calcium	151,00	212,00	N/A		Nutrient species will not be considered for treatment
iron	80,510	155,00	13,200	5 CCR 1002-8 Segment 5 standard. Temporary modification to Segment 5 until April 1, 1996	1,000 is a Segment 5 standard (Standard is for 1-day)
Lithlum	48	107	1,000		No federal or state surface or water quality standards exist. Suggest a value of 1,000 as 10 times the CLP Detection Limit
Magnesium	34,719	49,000			Nutrient species will not be considered for treatment
Manganese	1,611	2,490	1,000	Segment 4 and 5 Standard	Standard is 30- day average
Potassium	6,436	11,700			Nutrient species will not be considered for treatment

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Silicon	13,508	44,000			Nutrient species will not be considered for treatment
Sodium	71,367	110,00			Nutrient species will not be considered for treatment
Strontium	919	1,370	2,000		No federal or state surface or water quality standards exist. Suggest a value of 2,000 as 10 times the CLP Detection Limit
Tín	67	306	1,000		No federal or state surface or water quality standards exist. Suggest a value of 1,000 as 10 times the CLP Detection. Limit
Zinc	2,945	16,000	350	350 µg/L is Segment 5 standard 350 µg/L is the temporary modification to Segment 5 until April 1, 1996.	2,000 µg/L is WQCC basic surface water standard for agriculture (30-day average)
Gross Beta	11	17	4 mrem/year	SDWA MCL	mrem/yr
Strontlum-89/90	1.3	4 06	8	SDWA MCL	
Tritium	349	1,500	1,000	DOE DCG value	
Uranium-235	0 1	0 7	600	DOE DCG value	
Nitrite	30 33	63	500	5 CCR 1002-8 Segment 4 and 5 standard	Standard is 1-day
1 , 1 - Dichloroethane	6	10	59	6 CCR 1007-3, Section 268 43	
2-Butanone	12	76	280	6 CCR 1007-3, Section 268 43	

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2-Hexanone	5	10	100		No Federal I or State surface or water quality standards exist Suggest a value of 100 as 10 times the Cr P Detection Limit
4-Methyl-2- pentanone	11	87	140	6 CCR 1007-3 Section 268.43	
Acetone	33	220	280	6 CCR 1007-3 Section 268 43	
Benzene	2	5	1	5 CCR 1002-8, State Standard for Water Supply	
Carbon Disulfide	3	6	14	5 CCR 1002-8, State Standard for Water Supply	
Chloroethane	22	57	270	6 CCR 1007-3 Section 268 43	
Chloromethane	5	10	190	5 CCR 1002-8, State Standard for Water and FishSupply	
Ethylbenzene	13	18	680	5 CCR 1002-8, State Standard for Water Supply	
Methylene Chloride	14	190	4 7	5 CCR 1002- 8,Segment 4 and 5 standard	
Tetrachloroethane	2	5	1	5 CCR 1002-8, 3 1 11 PQL	
Toluene	38	88	1000	SDWA MCL	
Total Xylenes	14	25	10,000	SDWA MCL	
Trichloroethene	2	5	66	5 CCR 1002-8, Segment 5 standard. Temporary modification to Segment 5 until April 1, 1996	5 μg/L=5 CCR 1002-8, State standard for water supply

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Vinyl Acetate	7	49	500		No federal or state surface or water quality standards exist. Suggest a value of 500 as 10 times the Method 8240. Detection Limit.
Vinyi Chloride	5	11	2	5 CCR 1002-8, State Standard for Water Supply	
2,4- Dimethylphenol	5	10	2,120	5 CCR 1002-8 State Standard for Aquatic Life	Acute Value
2 - Methylnapthalene	16	23	100		Not listed in 40 CFR 302 4 or 6 CCR 1007-3 Pt 261 Appendix VII Suggest a value of 100 as 10 times the CLP Detection Limit
4-Methylphenol	4	10	100		Not listed in 40 CFR 302 4 or 6 CCR 1007-3 Pt 261 Appendix VII Suggest a value of 100 as 10 times the CLP Detection Limit (Note PPRG for residential surface water swimming is 140 mg/L)
Acenapthene	3	3	10	5 CCR 1002-8, 3 1 11 PQL	0 0028 is Segment 4 and 5 standard
Bis(2- ethylhexyl) phthalate	5	12	10	5 CCR 1002-8 31.11 PQL	1 8 = WQCC basic surface water standard

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Dibenzofuran	1	2	10		Not listed in 40 CFR 302 4 or 6 CCR 1007-3 Pt 261 Appendix VII Suggest a values of 100 as 10 times the CLP Detection Limit
Diethyl Phthalate	3	10	23,000	5 CCR 1002-8, State Standard for Water and Fish	
Fluorene	2	3	10	5 CCR 1002-8, 3.1.11 PQL	0.0028 is Segment 4 and 5 standard
Napthalene	18	22	10	5 CCR 1002-8, 3.1 11 PQL	0 0028 is Segment 4 and 5 standard
Phenanthrene	4	5	10	5 CCR 1002-8, 3 1 11 PQL	0 0028 is Segment 4 and 5 standard

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Attachment 2

Methylene Chloride

The data for methylene chloride is given in Table 2-1 and shown graphically in Figure 2-1. The data prior to 1990 should be used with caution since the QA/QC was lacking. The remaining data show three elevated readings and each has a "B" qualifier. This indicates that methylene chloride was also detected in the blank thus making the data highly questionable. It is recommended these value not be used in the determining contamination.

Benzene

The data for benzene is given in Table 2-2 and shown graphically in Figure 2-2 All data are at or below the detection limit. It cannot be said with certainty that benzene is even present in the water.

Vinyl Chloride

The data for vinyl chloride is given in Table 2-3 and shown graphically in Figure 2-3 Only one data point is above the detection limit. This data is from samples collected prior to 1990 and is shown with a "J" qualifier which means it is an estimated value.

Naphthalene

The data for naphthalene is given in Table 2-4 and shown graphically in Figure 2-4 Naphthalene is detected in enough samples to indicate that it is probably real. The levels detected are rather low

Antimony

The data for antimony is given in Table 2-5 and shown graphically in Figure 2-5. The numbers reported for antimony are very close the detection limit. It is not certain if antimony contamination exists. The readings may be due to naturally occurring minerals.

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£6-guA-61 31-Jan-93 Detection Limit 12-1nr-95 Data 28-Dec-91 te-nut-ft Date N3-Nov-90 7-May-90 68-15O-61 68-1qA-S 14-Sep-88 Fig 2-1 27-Feb-88 Concentration (ug/L) 200 40 0

Methylene Chloride for OU7 Seep

11

BENZENE 24 Mar 93 VOACLP III 6 Jun 88 VOACLP III 20 Jun 89 SW0097W06
SW00500W
SW00230W
SW00230W
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TABLE 2-2

£6-guA-61 31-Jan-93 - Detection Limit 15-Jul-92 Data 28-Dec-91 16-nul-11 Benzene Concentration for OU7 Seep Date Nov-90 7-May-90 98-15O-61 98-1qA-S 14-Sep-88 27-Feb-88 0 Concentration (ug/L)

TABLE 2-3 SW097 SW70046519W REAL

200	3W/00463 13W	3		SW70050ST	24 Mar 93	93 VOA8240	130	VINYL CHLORIDE	سِ	-	101101	=	-	1	
/FOMS	SW88A001		REAL		16 Jun 88	VOACLP	5	VINYI CHI DRIDE			100) 		201	
260MS	SW0979000 SW		REAL		83	VOACLP	116	VINYI CHI DRIDE	1	2 6	Tool of	<u>)</u>		0	
SW097	SW097002	W.	REAL		89	VOACI P	E	HOROLINAIN		3				101	
SW097	SW097003	WS.	REAL		39	89 VOACI P	133	VINYI CHI DOID		0		3		101	
SW097	SW097004	SW R	REAL		7 Jul 89 VOACI P	T	THE	VINY CHICANO				> 		10 /	
SW097	SW097005	WS.	REAL.		2 Aug 89	Т	1	VINCE CALCULO		-	o UGV.	<u> </u>		10	
SW097	SW097007		FEA		9 Oct 80	T		VIN TE CHEORIDE				7		10 \	
SW097	SW097008		REA		7 100. 80	T		AIIVEL CHLOHID		-	0 UG/L	3		10 A	
SW097	SW097009		REAL		A 000 A	T	2	VINYL CHLORIDE	اس	=	O UG/L	_		101	
SW097	SW0979000	36	BFA		200	1	2	VINYL CHLOHIDE	-	10		2		701	
SW097	SW097900	30	DEA1		of Jan 90	Т	2	VINYL CHLORIDE	اس	10	D UG/L			101	
SW097	SW0979000	3	N S O		13 1-60 90	T	5	VINYL CHLORIDE	w	10	D UGAL	2		101	
SW097	SWOOTWOR	3 8	3	1	23 Mar 90	T	THG	VINYL CHLORIDE	E	10	D UG/L	13		>01	
SW097	SWOOTWOO	38		0011	3 May 90	1	IFG	VINYL CHLORIDE	E.	4	4 UG/L	-		101	
CONTO		5 6		SWON/WOD	of out c	1	IFG	VINYL CHLORIDE	w.	10	ng/l	=			
CAMODA	MODEDOMS	3		SW00500W	6 Jul 90	90 VOACLP	TFG	VINYL CHLORIDE	9	10	D UG/I	=		2	
SOAMO O	MOOGOOMS	3		SW00500W	6 Jul 90		113	VINYL CHLORIDE	<u></u>	4	101	-			
ROMO	SWOOZIIW	AS .		SW00211W	2 Aug 90		27.0	VINYL CHLORIDE		15		<u>. :</u>		0	
SW097	SW00289W		REAL SW	SW00289W	6 Sep 90	T	E	VINY CHIODINE				<u> </u>		10	
SW097	WE WOODOWS		REAL SW	SW00370W	18	VOACI P	130	VINY CHIODING		5	J.OO.	_		10	
2W097	SW00471W	AS N	REAL	SW00471W		Γ		VINIO CLI OPIO		-	10 06/L	<u></u>		>	
SW097	SW00567W SW			┸	200	Т	2	VINTE CHLOHIDE		2	10 UG/L	כ		101	
SW097	SWOOGBEW			CIANOCOCIANO	2 080 80	Т	2	VINYL CHLORIDE		10	10 UG/L	2		>	
260MS	SW01093W			2400000AC	Apr 91	91 VOACLP	HG	VINYL CHLORIDE		10	0 UG/L	5		101	
CAMODA	1000			WESOLON	Z May 91	7	911	VINYL CHLORIDE		2	o UG/L	2	-		
SOANO O	WEED! OME			4	2 May 91		TRG	VINYL CHLORIDE		100	10 UG/I	=		0	
A COMP				!			TFG	VINYL CHLORIDE		100	101	-	+	2	
280097				SW01196W	=	VOACLP	B	VINYI CHI DRIDE				<u>ə</u>	1	10	
280082	SW80137W		DUP SW	SW01196W	19 Jun 91	Π	me	VINYI CHI DRIDE			OSVI.			10	
SW097	SW01299W		REAL SW	SW01299W	Ξ	Ī	132	VINY CHICAGO		2	O.C.L.	<u> </u>		0	
SW097	SW80142W SW		PNS	1_	ō		2	A STATE OF THE STA		10	UGVL	<u> </u>		10	
SW097	SW80143W	NS.		┸		Τ	2 8	VINTE CHECKINE		10	UG/L	_		10	
SW097	SW01405W	₩.	REAL SW	Ľ	16	T		VIIVE CALCHIDE		10	UG/L	_		10	
SW097	SW80152W	SW NS	PNS SW	SW01405W	28 Aug 91 V	OACLP	2 2	VINY CLICABOR		10	DG/L			10 <	
SW097	SW80153W	SW DC	DUP	SW01405W	A Aug 91	OAC! P	8	VINY CHICABO		2	10 UG/L	5		10 <	
SW097	SW01511W SW		REAL SW	SW01511W	25 Sep 91 V	OACI P	1	VINYI CLI ODIOC		2	UG/L	2		10 V	
SW097	SW01617W SW		REAL	SW01617W	V 10 91	OAC! P	2 2	VINY CHILDRIDE		10		٥		10 V	
SW097	SW70023ST SW		REAL	_	18	T	1	VIIVE CHECKION		8	UGA	<u>-</u>		1 0 A	
SW097	SW700265T	8		SWZDOZZET	118	T		VINTL CFILOHIDE		=	רפיו	-		101	
SW097	SW70027ST			┸	216	T	5	VINYL CHLORIDE		10		2		101	
SW097	SW7003151		T	1	V Call Bo	+		VINYL CHLORIDE		10	UG/L	5		> 01	
SWOOT	La COUCHA			Succession And	20 Feb 93 V	T		VINYL CHI.ORIDE		10	No.	<u> -</u>		2	
20000	20000			_1		93 VOACLP T		VINYL CHLONIDE		10	NG/L	<u> </u> =		2	
2000	344700403			150c00/MS	24 Mar 93/V	٦	Tr.G	VINYL CHLORIDE		101	011671	-		2	
											1	2		101	

£6-6uA-61 31-Jan-93 15-Jul-92 - Detection Limit 28-Dec-91 Data Vinyl Chloride Concentration for OU7 Seep te-nut-ft Date S3-Nov-90 7-May-90 19-0cf-89 2-Apr-89 88-q92-41 27-Feb-88 25 2 0 Concentration (ug/L)

SW0879000 9W SW087002 9W	2 SW	TEAL TEAL		6 Apr 89 BNACLP		5E 5E	NAPHTHALENE NAPHTHALENE	<u> </u>		7	100		
SW00370W SW	AS AS	EA EA	SW00370W	4 Oct 89 BNACLP		2 <u>11</u>	NAPHTHALENE	<u>8 8</u>		1	10 \		
WE WAS SOUNS	35	T.	SWOODBEW	3 Apr 91		IRG	NAPHTHALENE	14 UQU			10		
WE W 1910MS	¥ 9€	Æ	SW01617W	9 Oct 91	BNACLP	FG	NAPHTHALENE	22 UG/L	1		10 V		
SW097 SW7002451 SW	WS LS	3		17 Dec 92		FEG	NAPHTHALENE	1001			10 AL	42	
SW097 SW7002451 SW	ST SW	FEAL		17 Dec 92 BNACLP	BNACLP	ğ	NAPHTHALENE	200	_	-	12		
SW7002651	SI SW	PEAL.	SW7002751	25 Jan 93	25 Jan 93 BNACLP	IRG	NAPHTHALENE	14 UOVI			NO1		
SW7002751 9W	SI SW	PINS	SW7002651	25 Jan 93 BNACLP	1 1	FIG	NAPHTHALENE	10 UOU	_	ב	V 01		
SW7003151	SISW	SZ.	SW7003051	26 Feb 93 BNACLP	1 1	тю	NAPHTHALENE	7 UQVL		n	7 V		
WC120C007WS	SISW	ÆÆ	SW70031S1	26 Feb 93		Ā	NAPHTHALENE	7		7	10		
SW7003051	ST SW	REAL.	SW70031ST	26 Feb 93 BNACLP		HG.	NAPHTHALENE	20 UCUL	_		10 34	42	
SW70046S19W	SI SW	PEA.	SW7005051	24 Mar 93 BNACLP		E	NAPHTHALENE	25 UQV			10 A	42	
CWOODOOO SAN	10000	17.50		C LANG GA & CA A		\$	THIOCHUCK	5	_	=	-		

98 1qA-3 24-Mar-93 Se-Feb-93 Detection Limit S6-Feb-93 Se-Feb-93 Data 25-Jan-93 25~Jan-93 Date 17-Dec-92 17-Dec-92 16-100-6 16-1qA-E 06-120-7 98-10O-6 FIGURE 2-4 19-May-89 98-1qA-3 10 50 35 30 25 20 15 45 ည 0 Concentration (ug/L)

Naphthalene Concentration for OU7 Seep

17

TABLE 2-5

7			5										
Ocallon Sample	Type		Sample	Date	Analyte	2	Compound	Rosult	Units	Qualifier	Detect Llm	Validation	
Number	10		Number	Collected	Group								
1	_												
1	V60 100	REAL		16 Jun 88	TMotals	EG.	ANTIMONY	9	MGA	2			
	79000 SW	REAL		6 Apr 89 TMetals	TMetals	ING Di	ANTIMONY	18 6	UGY	m	9	V	
SW097 SW097002		REAL		19 May 09	TMetals	THG.	ANTIMONY	272	UG/L	3	60	<	
SW097 SW097003	_	REAL		20 Jun 89	TMetals	THG	ANTIMONY	28 9	UGA	2	09	>	
SW097 SW097004		REAL.		7 Jul 89	TMetals	<u> 11</u>	ANTIMONY	24 4	ηση	2	09		
2007 SW097005	7005 SW	REAL		2 Aug 89	TMetals	110	ANTIMONY	24 4	NGA	3	9	V	
SW097 SW097007		PEAL.			TMetals	116	ANTIMONY	33 1	NGA	3	60	V	
		PEA.		5 Dec 89 TMetals	Metals	170	ANTIMONY	34 5	Zg/	3	09	4	
SW097 SW097900C	79000 SW	HEAL.		12 Jan 90	TMetals	<u> </u>	ANTIMONY	0.5	MG/L		500		
SW097 SW0979000	1900d SW	REAL.		13 Feb 90	TMetals	<u> </u>	ANTIMONY	9	7gh)	09		
		REAL.		23 Mar 90	TMetals	11G	ANTIMONY	4 09	NG/L		60	٨	
	W05 SW	REAL		3 May 90	TMetals	TEG	ANTIMONY	09	UGY)	9		
	W06 9W	FEA.	SW097W06	5 Jun 90	TMetals	THG	ANTIMONY	09	UGA	n	9		
		REAL	SW00500W	06 Jul 90	TMetals	THG.	ANTIMONY	60	UG/L	ם	9		
		PEA.	SW00211W	2 Aug 90 TMetals	Metals	THG	ANTIMONY	212	UGA	80	09		
		EA.	SW00289W	6 Sep 90	TMetals	TFG	ANTIMONY	27 7	UGA	8	60		
	70W SW	PEAL	W07E00WS	4 Oct 90	TMetals	TING	ANTIMONY	26	UGAL	ב	9		
SW097 SW00471W		Ž	SW00471W	13 Nov 90	TMetals	THG	ANTIMONY	22	UGA.	n	0 05	>	
	WS MIZ	PEA.	SW00471W	13 Nov 90	TMetals	THG	ANTIMONY	22	22 UGAL	ב	9		
		REAL	SW00575W	3 Dec 90	TMetals	TRG	ANTIMONY	30	30 UGA	ם			
SW097 SW00986W	B6W SW	REAL.	SW00986W		TMetals	<u> </u>	ANTIMONY	25 6 UGA	UGA,	ñ	25 6		
		ZZ.	SW01093W	_	TMetals	ED.	ANTIMONY	25 6	UGA	2	0 05	>	
Ī		ā	SW01196W		TMetals	THG	ANTIMONY	-	UGY	ב	9	Υſ	12
		SE	SW01196W	_	TMotals	TIG	ANTIMONY	Ξ	UGA))	4C 09	Y	12
1		B	SW01299W	_	TMetals	ELE.	ANTIMONY	42 2		ם	42 2	>	
		SZ.	SW01299W		TMetals	HG.	ANTIMONY	42 2	חפע	ŋ	42.2	^	
1		REAL	SW01299W		TMetals	33	ANTIMONY	42.2	UG/L	n	42 2		
	WS M66	<u>7</u>	SW01299W		TMetals	22	ANTIMONY	42.2	ηď	n	42.2	>	
SW097 SW01405W	NSW SW	REAL	SW01405W		TMetals	55	ANTIMONY	42.2	NG/L) D	422	>	
1	53W SW	2	SW01405W		Metals	TFG	ANTIMONY	42.2	UG/L	5	42 2	>	
		28	SW01405W		TMetals	E	ANTIMONY	42.2	Z Z)	42.2	>	
Ì		REAL	SW01511W		TMetals	EG	ANTIMONY	14	UGA	ñ	9	>	
		REAL	SW01617W		TMetals	EE.	ANTIMONY	15			09	>	
	WS 12/10	REAL		17 Dec 92	TMetals	TFG	ANTIMONY	24 4	UGA	כ	24 4	٧٢	3
	2651 SW	HEAL.	SW70027ST		TMetals	THG.	ANTIMONY	19 7	UG/L	ם	19 7	>	
1	2751 SW	22	SW70026ST		TMetals	H	ANTIMONY	19 7	UG/L	ם	19 7	>	
		PAS	SW70030ST	26 Feb 93	TMetals	E	ANTIMONY	19.7		ח	19 7	>	
١		SZ.	SW70030ST	26 Feb 93	TMetals	3	ANTIMONY	19 7	UGA	ב	19 7		
		REAL	SW70031ST		Metals	52	ANTIMONY	19.7	ŊĠΛ	ח	19.7	>	
SW097 SW7004651		PEA	SW70050ST	24 Mar 93 TMetals	Motals	TRG	ANTIMONY	19.9	UGA.	כ	19 9	>	
097 SW70046ST	M651SW	REAL	SW70050ST		Metals	OUP P	ANTIMONY	199	חפע	ם	199		

24-Mar-93 24-Mar-93 S6-Feb-93 S6-Feb-93 S6-Feb-93 25-Jan-93 25-Jan-93 Detection Limit 17-Dec-92 16-15O-6 25-Sep-91 Data 16-guA-85 16-guA-82 18-guA-82 18-Jul-92 16-lut-62 16-lut-62 16-lut-62 16-nut-e1 16-nut-e1 2-May-91 3-Apr-91 Total Antimony for OU7 Seep 3-Dec-90 13-Nov-90 13-Nov-90 4-Oct-90 06-daS-9 0e-guA-S 06-Inr-9 06-unr-9 3-May-90 23-Mar-90 13-Feb-90 12-Jan-90 5-Dec-89 5 2 98-15O-6 68-guA-S 68-Inc-7 20-Jun-89 19-May-89 68-1qA-9 009 300 200 100 500 400 0 Concentration (ug/L)

19/19